

General

Guideline Title

Management of adult pancreatic injuries: a practice management guideline from the Eastern Association for the Surgery of Trauma.

Bibliographic Source(s)

Ho VP, Patel NJ, Bokhari F, Madbak FG, Hambley JE, Yon JR, Robinson BR, Nagy K, Armen SB, Kingsley S, Gupta S, Starr FL, Moore HR III, Oliphant UJ, Haut ER, Como JJ. Management of adult pancreatic injuries: a practice management guideline from the Eastern Association for the Surgery of Trauma. J Trauma Acute Care Surg. 2017 Jan;82(1):185-99. [58 references] [PubMed](#)

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The strength of recommendation (strong or weak/conditional) and levels of evidence (high, moderate, low or very low) are defined at the end of the "Major Recommendations" field.

Treatment of Low-Grade Injury Diagnosed by Computed Tomography (CT) (Patient, Intervention, Comparators, Outcome [PICO] 1)

For adult patients with grade I/II injuries to the pancreas identified by CT scan, should operative intervention or nonoperative management be performed?

Recommendation

The guideline authors conditionally recommend nonoperative management for grade I/II pancreatic injuries diagnosed by CT scan. Nonoperative management appears to have low morbidity. If the pancreatic duct is not definitively intact, it seems reasonable to further evaluate the duct with additional tests, such as endoscopic retrograde cholangiopancreatography (ERCP) or magnetic resonance cholangiopancreatography (MRCP), because this may change the grade of the injury and therefore the recommended treatment plan.

Treatment of High-Grade Injury Diagnosed by CT (PICO 2)

For adult patients with grade III/IV injuries to the pancreas identified on CT scan, should operative intervention or nonoperative management be performed?

Recommendation

The guideline authors conditionally recommend operative management for grade III/IV pancreatic injuries diagnosed by CT scan. Although there was no statistically significant difference between groups for any single outcome, the guideline group feels that there is a cumulative trend toward increased morbidity after nonoperative management. Treatment failures after nonoperative management occur regularly, and treatment delays likely contribute to morbid complications and death.

Operative Management of Low-Grade Injury (PICO 3)

For adults undergoing an operation who are intraoperatively found to have a grade I/II pancreas injury, should resectional or nonresectional management be performed?

Recommendation

The guideline authors conditionally recommend nonresectional management for operative management of grade I/II pancreatic injuries. Pooled data analysis suggests that mortality from pancreas-related causes is generally low in this population and that there were significantly more intra-abdominal abscesses in the resection group.

Operative Management of High-Grade Injury (PICO 4)

For adults already undergoing an operation who are intraoperatively found to have a grade III/IV pancreas injury, should resection or nonresection be performed?

Recommendation

The guideline authors conditionally recommend resection for operative management of grade III/IV pancreatic injuries. Complications are frequent in both groups. In the pooled analysis, fistula development was associated with nonresection strategies. Pancreas-related mortality was higher in the nonresection group, but this finding was potentially confounded by incomplete mortality reporting and bias. Due to the very low quality of available data, this is a conditional recommendation.

Treatment of Grade V Injury (PICO 5)

For adults with total destruction of the head of the pancreas (grade V), should pancreaticoduodenectomy or surgical treatment other than pancreaticoduodenectomy be performed?

Recommendation

No recommendation is given. The literature on this topic is limited and dated. Surgical and resuscitation strategies have evolved significantly to include damage control procedures and early balanced resuscitations, making the guideline authors' ability to interpret the available literature limited. Grade V injury to the pancreas is extremely morbid, and the intraoperative and immediate postoperative rate of death is high.

Routine Postoperative Fistula Prophylaxis with Octreotide (PICO 6)

For adult patients who have undergone an operation for pancreatic trauma, should routine octreotide prophylaxis or no octreotide be used?

Recommendation

The guideline authors conditionally recommend against the routine use of octreotide for postoperative prophylaxis related to traumatic pancreatic injuries to prevent fistula. Data are limited, but pooled data show no difference in outcomes between groups. The subcommittee concluded that the less invasive (no medication) strategy would be preferable with no difference in outcomes.

Routine Splenectomy with Distal Pancreatectomy (PICO 7)

For adults undergoing a distal pancreatectomy for trauma, should routine splenectomy or splenic preservation be performed?

Recommendation

No recommendation is given. Existing data do not support either treatment modality, although splenic preservation was only considered for stable patients. If either the stability of the patient or the surgeon's ability to safely preserve the spleen is in doubt, a distal pancreatectomy with splenectomy is a reasonable choice.

Definitions

Grading of Recommendations Assessment, Development and Evaluation (GRADE) Methodology Levels for Rating the Quality of Evidence

Quality Level	Definitions
High	Very confident that the true effect lies close to estimate of effect.
Moderate	Moderate effect; true effect is likely close to estimate of effect but may be substantially different.
Low	Limited confidence; true effect may be substantially different from estimate of effect.
Very Low	Little confidence; true effect likely substantially different from estimate of effect.

GRADE Definition of Strong and Weak Recommendation

	Strong Recommendation	Weak/Conditional Recommendation
For patients	Most patients would want the recommended course of action.	Most patients would want the recommended course of action, but many would not.
For clinicians	Most patients should receive the recommended course of action.	Different choices will exist for different patients, and clinicians should help patients decide.
For policy makers	Recommended course should be adopted as policy.	Considerable debate and stakeholder involvement needed to make policy.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Pancreatic injury (grade I-V)

Note: Injury severity is classified per the American Association of the Surgery of Trauma Pancreatic Injury Scoring Scale. Grades I and II include pancreatic contusions and lacerations that spare the pancreatic duct. Grade III injuries include pancreatic duct injuries at the body and tail, including distal transection. Grade IV injuries include ductal injuries at the pancreatic head, involving the ampulla. Grade V injuries include massive disruption of the pancreatic head.

Guideline Category

Management

Treatment

Clinical Specialty

Critical Care

Emergency Medicine

Gastroenterology

Surgery

Intended Users

Physicians

Guideline Objective(s)

- To provide evidence-based recommendations for the physician who is presented with traumatic injury to the pancreas
- To determine optimal treatment for patients with pancreatic injuries

Target Population

Adult patients with pancreatic injuries

Interventions and Practices Considered

1. Operative intervention versus nonoperative management
2. Resectional versus nonresectional management
3. Octreotide versus no octreotide

Note: Pancreaticoduodenectomy versus surgical treatment other than pancreaticoduodenectomy for Grade V injuries and routine splenectomy versus splenic preservation were considered but no recommendations are given. The authors recommend against routine use of octreotide.

Major Outcomes Considered

- Mortality
- Chronic pancreatitis
- Pancreatic fistula and/or leak
- Sepsis
- Hospital length of stay
- Intensive care unit length of stay
- Intraabdominal abscess
- Time to closure of pancreatic leak
- Operative time
- Blood loss

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Identification of References

A systematic search of the MEDLINE database using PubMed was performed on December 9, 2014, with the assistance of a professional librarian using the following search terms: ("Pancreas/surgery" [MeSH] AND ("wounds and injuries" [MeSH Terms] OR ("wounds" [All Fields] AND "injuries" [All Fields]) OR "wounds and injuries" [All Fields])). Related articles and bibliographies of included studies and reviews were searched manually. The guideline authors only included English-language retrospective and prospective studies from January 1965 until December 2014. Articles that did not describe ductal injuries (either by anatomic description or by formal grading system) were excluded.

Three hundred nineteen articles were screened for relevance. Fifty-two articles were reviewed in full by the subcommittee members. Fifteen additional articles were excluded because data were not grouped by pancreatic injury severity or treatment methodology and outcomes could not

be extracted. Thirty-seven articles were included for data extraction (see Figure 1 in the original guideline document); included articles were single or multiple institution retrospective studies or case series, as well as a single prospective randomized trial that compared closed suction and sump for postoperative drainage of the pancreas. Twenty nine articles were reviewed for Population, Intervention, Comparators, Outcome (PICO) 1 to 5, two articles were reviewed for PICO 6, and 13 articles were reviewed for PICO 7.

Number of Source Documents

Thirty-seven articles were included for data extraction (see Figure 1 in the original guideline document). Twenty-nine articles were reviewed for Population, Intervention, Comparators, Outcome (PICO) questions 1 to 5, two articles were reviewed for PICO 6, and 13 articles were reviewed for PICO 7.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Grading of Recommendations Assessment, Development and Evaluation (GRADE) Methodology Levels for Rating the Quality of Evidence

Quality Level	Definitions
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Very Low	Little confidence; true effect likely substantially different from estimate of effect.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Data Extraction and Methodology

Each article was reviewed by two subcommittee members to ensure concordance. If discordance occurred, a third subcommittee member re-reviewed the article. Data were then entered into a Microsoft Excel (Microsoft, Redmond, WA) spreadsheet. All entered data were checked in triplicate by the primary investigator to ensure accuracy. The quality of evidence was evaluated for each of the following domains: risk of bias, inconsistency, indirectness, imprecision, and publication bias.

Within the literature, there was no uniform definition for pancreatic leak, fistula, sepsis, or mortality. Resectional management was defined as a procedure in which pancreatic tissue was removed by the surgeon in a manner that required transection of the pancreas (such as a distal pancreatectomy or a pancreaticoduodenectomy). Conversely, if no resection was performed, this was defined as nonresectional management; this generally included pancreatic repair, debridement, and placement of drains. Deaths were included if they were "pancreas-related" or not specified. Deaths attributed to causes other than the pancreatic injury were not extracted for pooled analysis but were noted for discussion. Intraoperative deaths and preoperative deaths were also not included in pooled analysis, because the committee felt that pancreatic injuries do not generally lead to immediate death; intraoperative and preoperative deaths are likely secondary to associated injuries. Pseudocysts and peripancreatic fluid collections that required intervention were included as pancreatic fistulae/leaks. Failure of nonoperative management was noted, although not a formal outcome for Population, Intervention, Comparators, Outcome (PICO) questions, as a possible outcome for nonoperatively managed patients. This was defined as patients who required operative intervention after initial plan for nonoperative management. Data for each outcome were analyzed using STATA/SE, 14.0 (College Station, TX). Summary of findings tables were created using GRADEpro software

(<http://gdt.guidelinedevelopment.org/>). Data were pooled and relative risk and risk differences were calculated, with 95% confidence intervals.

Qualitative Synthesis

Please refer to the original guideline document for details of the qualitative synthesis performed for each PICO question.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

The guideline authors created a set of Population, Intervention, Control, Outcome (PICO) questions (see below). Subcommittee members weighed the pooled data outcomes and literature quality to determine recommendations for each PICO question. The strength of the recommendations was based on the evidence, risk-versus-benefit ratio, and patient values.

PICO 1

For adults with grade I/II injury to the pancreas identified by computed tomography (CT) scan (P), should operative intervention (I) or nonoperative management (C) be performed?

PICO 2

For adults with grade III/IV injury to the pancreas identified by CT scan (P), should operative intervention (I) or nonoperative management (C) be performed?

PICO 3

For adults undergoing an operation who are intraoperatively found to have a grade I/II pancreas injury (P), should resectional (I) or nonresectional management (C) be performed?

PICO 4

For adults undergoing an operation who are intraoperatively found to have a grade III/IV pancreas injury (P), should resectional (I) or nonresectional management (C) be performed?

PICO 5

For adults with total destruction of the head of the pancreas (grade V) (P), should pancreaticoduodenectomy (I) or surgical treatment other than pancreaticoduodenectomy (C) be performed?

PICO 6

For adults who have undergone an operation for pancreatic trauma (P), should routine octreotide prophylaxis (I) or no octreotide (C) be used?

PICO 7

For adults undergoing distal pancreatectomy for trauma (P), should routine splenectomy (I) or splenic preservation (C) be performed?

Rating Scheme for the Strength of the Recommendations

Grading of Recommendations Assessment Development, and Evaluation (GRADE) Definition of Strong and Weak Recommendation

	Strong Recommendation	Weak/Conditional Recommendation
For patients	Most patients would want the recommended course of action.	Most patients would want the recommended course of action, but many would not.

For clinicians	Most patients should receive the recommended course of action.	Different choices will exist for different patients, and clinicians should help patients decide.
For policy makers	Recommended course should be adopted as policy.	Considerable debate and stakeholder involvement needed to make policy.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Not stated

Description of Method of Guideline Validation

Not applicable

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

Included articles were single or multiple institution retrospective studies or case series, as well as a single prospective randomized trial that compared closed suction and sump for postoperative drainage of the pancreas. The quality of evidence was very low for all outcomes for all Population, Intervention, Control, Outcome (PICO) questions.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate management of adult pancreatic injuries

Refer to the "Qualitative Synthesis" sections of the original guideline document for benefits of specific interventions.

Potential Harms

Therapeutic operative interventions for pancreatic injury are typically treated by drainage or suture repair for minor injuries, whereas more extensive injuries generally require pancreatic resection. Surgeons have advocated various reconstruction options after resection, including gastrojejunostomy, Roux-en-Y reconstructions, and pancreaticoduodenectomy. Commonly reported complications have included fistulae, pseudocysts, intraabdominal abscesses, and pancreatitis.

Refer to the "Qualitative Synthesis" sections of the original guideline document for harms of specific interventions.

Qualifying Statements

Qualifying Statements

- The Eastern Association for the Surgery of Trauma (EAST) is a multi-disciplinary professional society committed to improving the care of injured patients. The Ad Hoc Committee for Practice Management Guideline Development of EAST develops and disseminates evidence-

based information to increase the scientific knowledge needed to enhance patient and clinical decision-making, improve health care quality, and promote efficiency in the organization of public and private systems of health care delivery. Unless specifically stated otherwise, the opinions expressed and statements made in this publication reflect the authors' personal observations and do not imply endorsement by nor official policy of EAST.

- "Clinical practice guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."⁸ These guidelines are not fixed protocols that must be followed, but are intended for health care professionals and providers to consider. While they identify and describe generally recommended courses of intervention, they are not presented as a substitute for the advice of a physician or other knowledgeable health care professional or provider. Individual patients may require different treatments from those specified in a given guideline. Guidelines are not entirely inclusive or exclusive of all methods of reasonable care that can obtain/produce the same results. While guidelines can be written that take into account variations in clinical settings, resources, or common patient characteristics, they cannot address the unique needs of each patient nor the combination of resources available to a particular community or health care professional or provider. Deviations from clinical practice guidelines may be justified by individual circumstances. Thus, guidelines must be applied based on individual patient needs using professional judgment.
- These guidelines represent a detailed summary of the literature regarding treatment for pancreatic trauma. Most studies are from large trauma centers and may not be applicable to all centers or all situations and are intended to inform the decision-making process rather than to replace clinical judgment. Pancreatic injuries without involvement of the pancreatic duct appear to have low morbidity, and therefore management without resection appears to be safe. Higher-grade injuries involving the pancreatic duct have increased attributable morbidity and mortality as well as potential for deterioration if treatment is delayed, and literature supports resection in these cases.

⁸Institute of Medicine. Clinical practice guidelines: directions for a new program. MJ Field and KN Lohr (eds) Washington, DC: National Academy Press. 1990: pg 39.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Ho VP, Patel NJ, Bokhari F, Madbak FG, Hambley JE, Yon JR, Robinson BR, Nagy K, Armen SB, Kingsley S, Gupta S, Starr FL, Moore HR III, Oliphant UJ, Haut ER, Como JJ. Management of adult pancreatic injuries: a practice management guideline from the Eastern Association for the Surgery of Trauma. J Trauma Acute Care Surg. 2017 Jan;82(1):185-99. [58 references] [PubMed](#)

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2017 Jan

Guideline Developer(s)

Eastern Association for the Surgery of Trauma - Professional Association

Source(s) of Funding

Eastern Association for the Surgery of Trauma (EAST)

Guideline Committee

Management of Adult Pancreatic Injuries Guidelines Committee

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

Dr. Bokhari was a Bristol Myers Squibb panel participant in last 36 months and is on the Speaker panel for Abbott Point of Care.

Dr. Haut is the primary investigator of a contract (CE-12-11-4489) with the Patient-Centered Outcomes Research Institute (PCORI), entitled "Preventing Venous Thromboembolism: Empowering Patients and Enabling Patient-Centered Care via Health Information Technology." Dr. Haut receives royalties from Lippincott, Williams, Wilkins for a book, *Avoiding Common ICU Errors*. Dr. Haut is a paid consultant and speaker for

the "Preventing Avoidable Venous Thromboembolism—Every Patient, Every Time" VHA IMPERATIV® Advantage Performance Improvement Collaborative and the Illinois Surgical Quality Improvement Collaborative.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the [Eastern Association for the Surgery of Trauma \(EAST\) Web site](#) .

Availability of Companion Documents

The following is available:

- Kerwin AJ, Haut ER, Burns JB, Como JJ, Haider A, Stassen N, Dahm P, Eastern Association for the Surgery of Trauma Practice Management Guidelines Ad Hoc Committee. The Eastern Association of the Surgery of Trauma approach to practice management guideline development using Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology. J Trauma Acute Care Surg. 2012 Nov;73(5 Suppl 4):S283-7. Available from the [Eastern Association for the Surgery of Trauma \(EAST\) Web site](#) .

Supplemental digital content is available from the [Journal of Trauma and Acute Care Surgery Web site](#) .

In addition, a continuing medical education (CME) activity for this guideline is available in the [original guideline document](#) .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on March 8, 2017. The information was verified by the guideline developer on March 20, 2017.

Copyright Statement

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